# TYPE 4:

$$2x^2 + x - 3$$

Factorise using:

## a. 'Going commando'*

Essentially 'intelligent guessing' of the two brackets, by considering what your guess would expand to

$(2$ ? ? $)($ ? ? $)$

How would we get the term in the expansion?

How could we get the -3?

## b. Splitting the middle term

Again, need two numbers which add to give two numbers.

$2x^2 + x - 3$ ⊕ 1

Unlike before, we want two numbers which multiply to give the **first times the last number**.

We use these two numbers (3 and -2) to '**split the middle term**'. Everything else remains the same.

$2x^2 + 3x - 2x - 3$

Factorise first and second half separately.

Leave a space and duplicate the bracket. Then what fills the gap to expand to give ?

¿ $x(2x+3) - 1(2x+3)$

¿ $(2x+3)(x-1)$

There's a common factor of

* Not official mathematical terminology.

# Further Example

$$12x^2+17x-5$$

$\theta 17$

60 1
30 2
20 3

This looks good as difference of 20 and 3 is 17.
Numbers are 20 and -

$$¿\,12x^2+20x-3x-5$$

Note that it doesn't matter whether we split as or . You'll end up with same final result.

$$¿\,4x(3x+5)-1(3x+5)$$

A common error is to not fully factorise, e.g. writing or . This causes problems with factorising the second half.

$$¿\,(3x+5)(4x-1)$$

# One Final Example

$4x^2 - 9x - 9$

$\oplus \; -9$

| | |
|---|---|
| 36 | 1 |
| 18 | 2 |
| 12 | 3 |

$\iota 4x^2 - 12x + 3x - 9$

$\iota 4x(x-3) + 3(x-3)$

$\iota (x-3)(4x+3)$

Make sure you write +3 and not just 3, as  would mean you are multiplying by the  and not adding it.

# Test Your Understanding

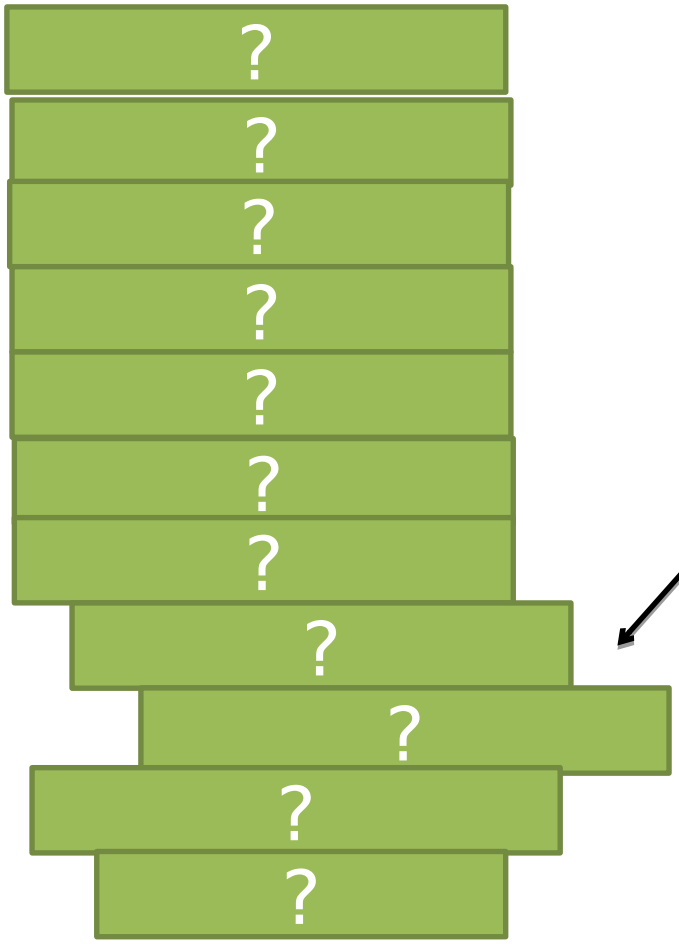
?

?

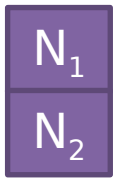
For this one splitting the middle term is difficult! Use ‘intelligent guessing’ of the two brackets.

?

# Exercise 4


‘Commando’ starts to become difficult from this question onwards because the coefficient of  is not prime.




# Answers

1

2

3

4

5

6

7

8

9

10

11

$N_1$

$N_2$

‘Commando’ starts to become difficult from this question onwards because the coefficient of  is not prime.